

Listing of Claims:

Claims 1-30 (Canceled).

31. (Currently Amended) A method for simulating an electric network including a plurality of circuit elements connected by a plurality of wiring lines, said method comprising:

defining electric functions of the plurality of circuit
5 elements as a plurality of element cells;

defining intersections of the wiring lines at which at least three of the circuit elements are connected as intersection cells;

defining as a plurality of pipes, wiring lines extending
10 between any of: (i) an element cell and another element cell, (ii) an intersection cell and another intersection cell, and (iii) an element cell and an intersection cell;

setting respective rules of transfer of particles through the element cells based on respective types of the element cells,
15 and setting respective rules of transfer of particles through the intersection cells;

performing transfers of the particles through the element cells and the intersection cells based on the respective rules;

repeating the transfers until a predetermined convergence
20 condition is satisfied at which a respective number of particles

in each of the pipes is substantially steady and a respective number of particles moved through each of the element cells and intersection cells is substantially steady; ~~and~~

determining the number of particles in each of the pipes and
25 the number of particles moved through each of the element cells and each of the intersection cells when the predetermined convergence condition is satisfied; and

determining voltages in the electric network based on the
determined number of particles in each of the pipes, and
30 determining currents in the electric network based on the
determined number the particles moved through each of the element
cells and intersection cells, without solving simultaneous
differential equations.

32. (Canceled).

33. (Currently Amended) An apparatus for simulating an electric network including a plurality of circuit elements connected by a plurality of wiring lines, said apparatus comprising:

5 a defining unit configured to: define electric functions of the plurality of circuit elements as a plurality of element cells, define intersections of the wiring lines at which at least three of the circuit elements are connected as intersection

cells, and define as a plurality of pipes, wiring lines extending
10 between any of: (i) an element cell and another element cell,
(ii) an intersection cell and another intersection cell, and
(iii) an element cell and an intersection cell;

a setting unit configured to set respective rules of
transfer of particles through the element cells based on
15 respective types of the element cells, and to set respective
rules of transfer of particles through the intersection cells;
and

a determining unit configured to: (i) perform transfers of
the particles through the element cells and the intersection
20 cells based on the respective rules, (ii) repeat the transfers
until a predetermined convergence condition is satisfied at which
a respective number of particles in each of the pipes is
substantially steady and a respective number of particles moved
through each of the element cells and intersection cells is
25 substantially steady, and (iii) determine the number of particles
in each of the pipes and the number of particles moved through
each of the element cells and each of the intersection cells when
the predetermined convergence condition is satisfied; and

a second determining unit configured to: (i) determine
30 voltages in the electric network based on the determined number
of particles in each of the pipes, and (ii) determine currents in
the electric network based on the determined number the particles

moved through each of the element cells and intersection cells,
without solving simultaneous differential equations.

34. (Canceled).

35. (Currently Amended) A storage medium having a
simulation program stored thereon for causing a computer to
simulate an electric network including a plurality of circuit
elements connected by a plurality of wiring lines, said
5 simulation program causing the computer to perform the steps of:

defining electric functions of the plurality of circuit
elements as a plurality of element cells;

defining intersections of the wiring lines at which at least
three of the circuit elements are connected as intersection
10 cells;

defining as a plurality of pipes, wiring lines extending
between any of: (i) an element cell and another element cell,
(ii) an intersection cell and another intersection cell, and
(iii) an element cell and an intersection cell;

15 setting respective rules of transfer of particles through
the element cells based on respective types of the element cells,
and setting respective rules of transfer of particles through the
intersection cells;

performing transfers of the particles through the element
20 cells and the intersection cells based on the respective rules;
repeating the transfers until a predetermined convergence
condition is satisfied at which a respective number of particles
in each of the pipes is substantially steady and a respective
number of particles moved through each of the element cells and
25 intersection cells is substantially steady; ~~and~~
determining the number of particles in each of the pipes and
the number of particles moved through each of the element cells
and each of the intersection cells when the predetermined
convergence condition is satisfied; and
30 determining voltages in the electric network based on the
determined number of particles in each of the pipes, and
determining currents in the electric network based on the
determined number the particles moved through each of the element
cells and intersection cells, without solving simultaneous
35 differential equations.

36. (Canceled).